CMS Software Overview

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CMS Software Projects

∨ **CMS Software is organized into Projects (e.g. COBRA, ORCA)**

∨ **Each project**

    r Has a separate CVS repository for source

    r Has a distinct environment (although setup procedures are analogous)

    r Is divided into Subsystems

∨ **Each Subsystem**

    r Is divided into Packages

∨ **Each Package**

    r Is built into (at most) one shared library

    r Is responsible for building zero or more executables

Overview of CMS Projects

∨ **COBRA – Framework**

  r Coherent Object-oriented Base Reconstruction and Analysis

∨ **ORCA - Reconstruction**

  r Object-oriented Reconstruction for CMS Analysis

∨ **OSCAR - Simulation**

  r Object-oriented Simulation for CMS Analysis and Reconstruction

∨ **IGUANA - Visualization**

  r Interactive Graphical User Analysis

∨ **FAMOS - Fast Simulation**

∨ **IGUANACMS - IGUANA for CMS**

∨ **Geometry**

∨ **SCRAM - Configuration Tool**

  r Software Configuration Release and Management

Selected External Software

- **POOL**
  - LCG Persistency Framework

- **SEAL**
  - LCG Core Libraries and Services

- **ROOT**

- **GEANT4, CMSIM, PYTHIA, CLHEP, etc.**

- **Many others**

Cobra Overview

∨ **Depends on**

   r POOL, SEAL, ROOT, Scram(for configuration)

∨ **Is depended on by**

   r ORCA, OSCAR, FAMOS, IGUANACMS, Geometry

∨ **Provides**

   r Event Data Model

   r Main program and event loop

   r Framework for Simulation

   r Framework for Digitization

   r Framework for Reconstructed Objects (e.g. RecCollection, RecQuery)

   r and more

Cobra Subsystems

- **CARF – Common Analysis Reconstruction Framework**
  - The guts of the framework
- **Utilities**
  - General purpose code used by CARF and others
- **Profound**
  - Code common to ORCA and OSCAR (avoids duplication)
- **DDD – Detector Description Database**
- **Mantis – OSCAR's interface to GEANT4**
- **GeneratorInterface – OSCAR's interface to PYTHIA et. al.**
- **MagneticField**
- **ClassReuse – classes for 2D and 3D vectors**
  - 4-vectors in CLHEP, not here

ORCA Overview

ᵥ **Depends on**

   ᵣ COBRA, POOL, SEAL, ROOT, SCRAM (for configuration)

ᵥ **Provides**

   ᵣ Reconstruction

- Hits
- Digis
- Reconstructed Objects

   ᵣ Analysis

- JetMet
- Muons
- e-gamma
- b-tau
- etc.

Most ORCA Subsystems

- ∨ **Calorimetry**
- ∨ **CommonDet**
- ∨ **CommonReco**
- ∨ **ElectronPhoton**
- ∨ **HeavyIonAnalysis**
- ∨ **JetMetAnalysis**
- ∨ **Jets**
- ∨ **Muon**
- ∨ **MuonReco**
- ∨ **Tracker**
- ∨ **TrackerReco**
- ∨ **Trigger**
- ∨ **Vertex**
- ∨ **bTauAnalysis**

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